W5-2: From the stock pond at W-5 to the highway and the Little Wind River the stream is ephemeral and only flows during heavy storms and/or spring snow melt.

Sites 11.5 and 12, at Phoenix Rolff Lake and Site 13 as a reference site on Dry Creek

Site Dry Creek at bridge (DC-13)

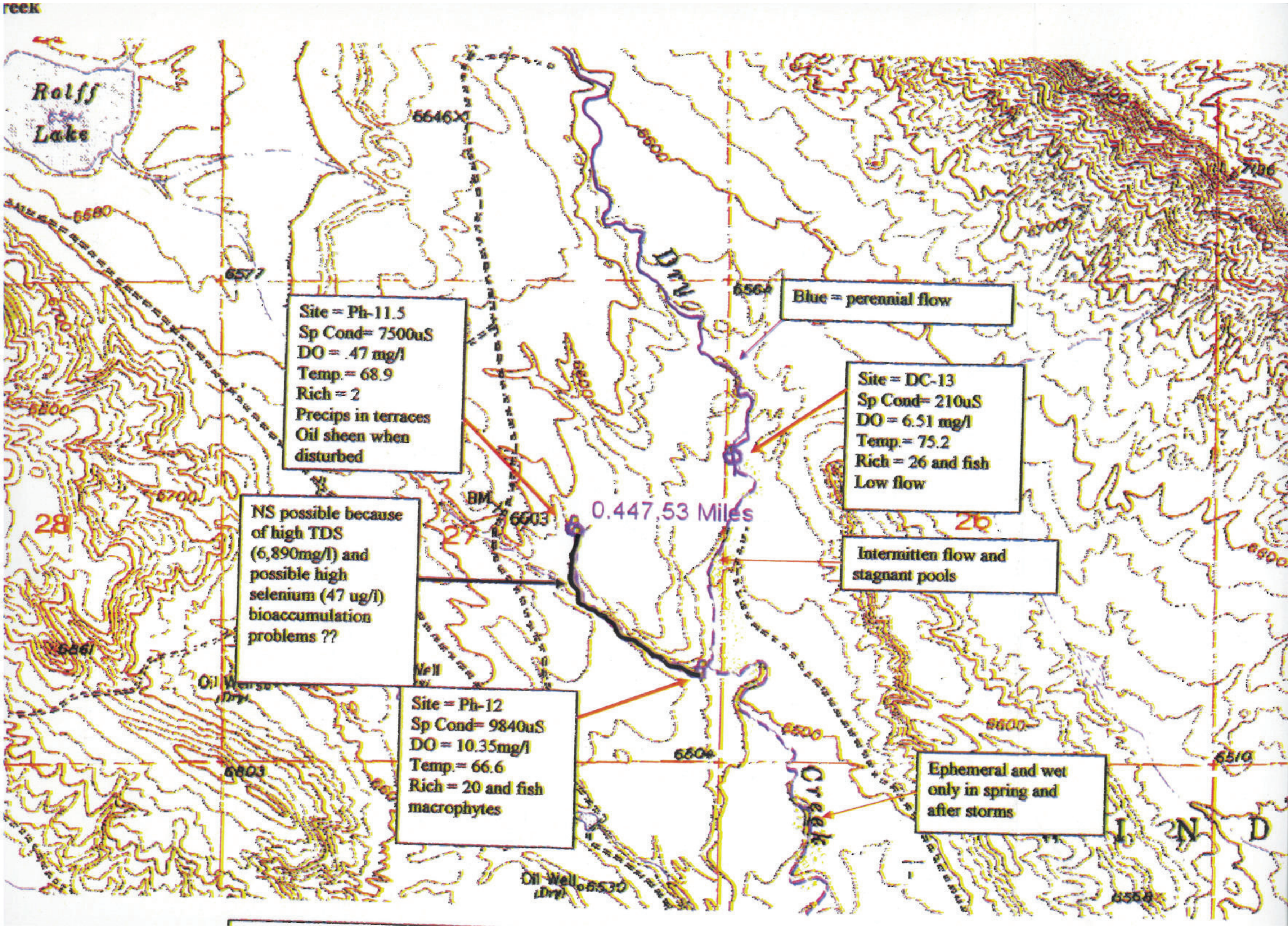
NPDES sites

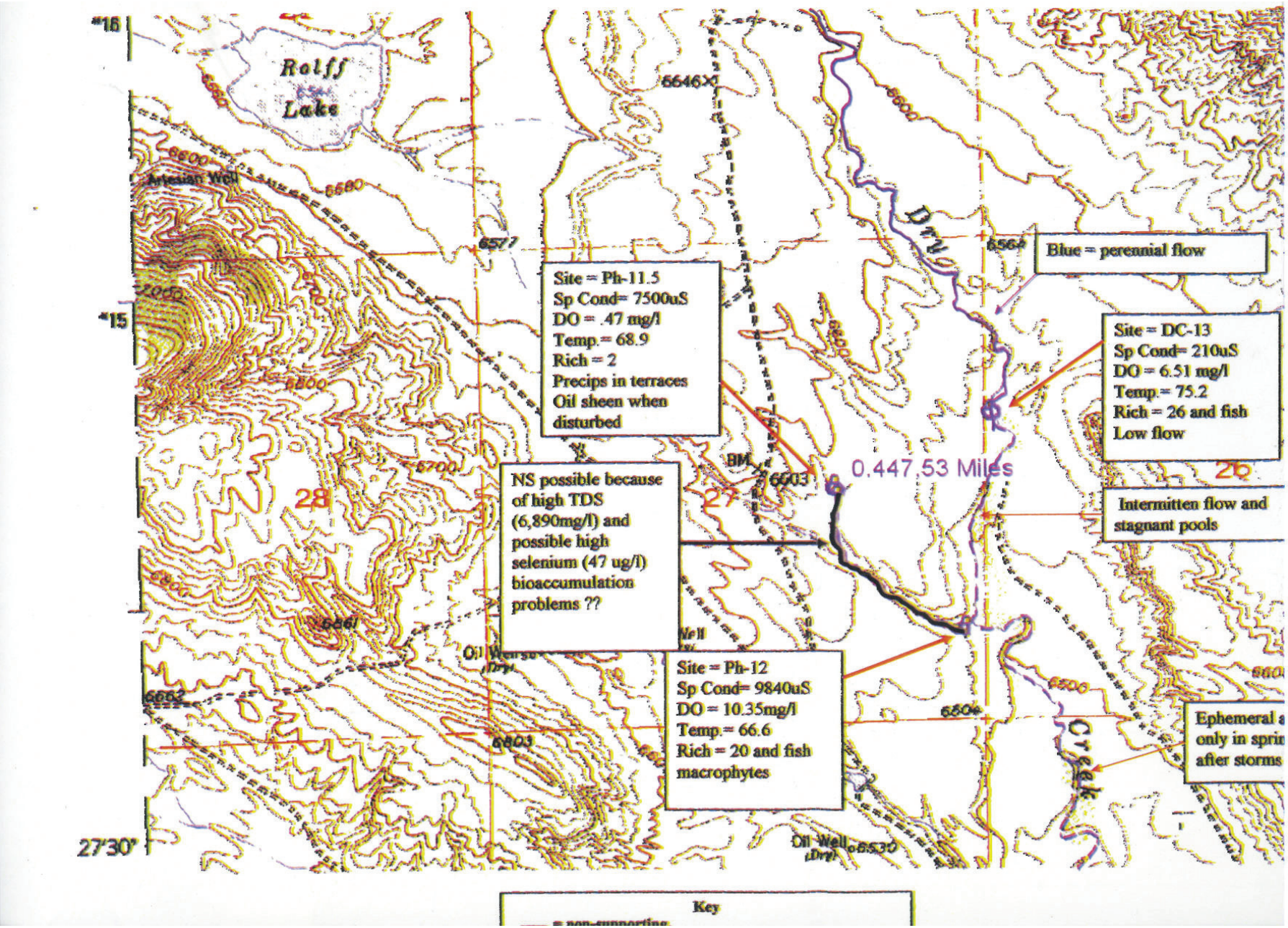
Site	Site name	Str or Lk name	II_Geology	VI_Ros I_1	VI_Ros II_1	VI_Ros I_2	VI_Ros II_2	elev	Lat	Long	VIII_Anth_Ps_6	IX_Degree_6	Lim Season_6	X_Status	XI_Mgmt
DC-13	Dry Creek @ bridge to Phoenix	Dry Creek	Sed	C	3			6530	43° 28' 13.9"N	109° 05' 24.1"W				FS	

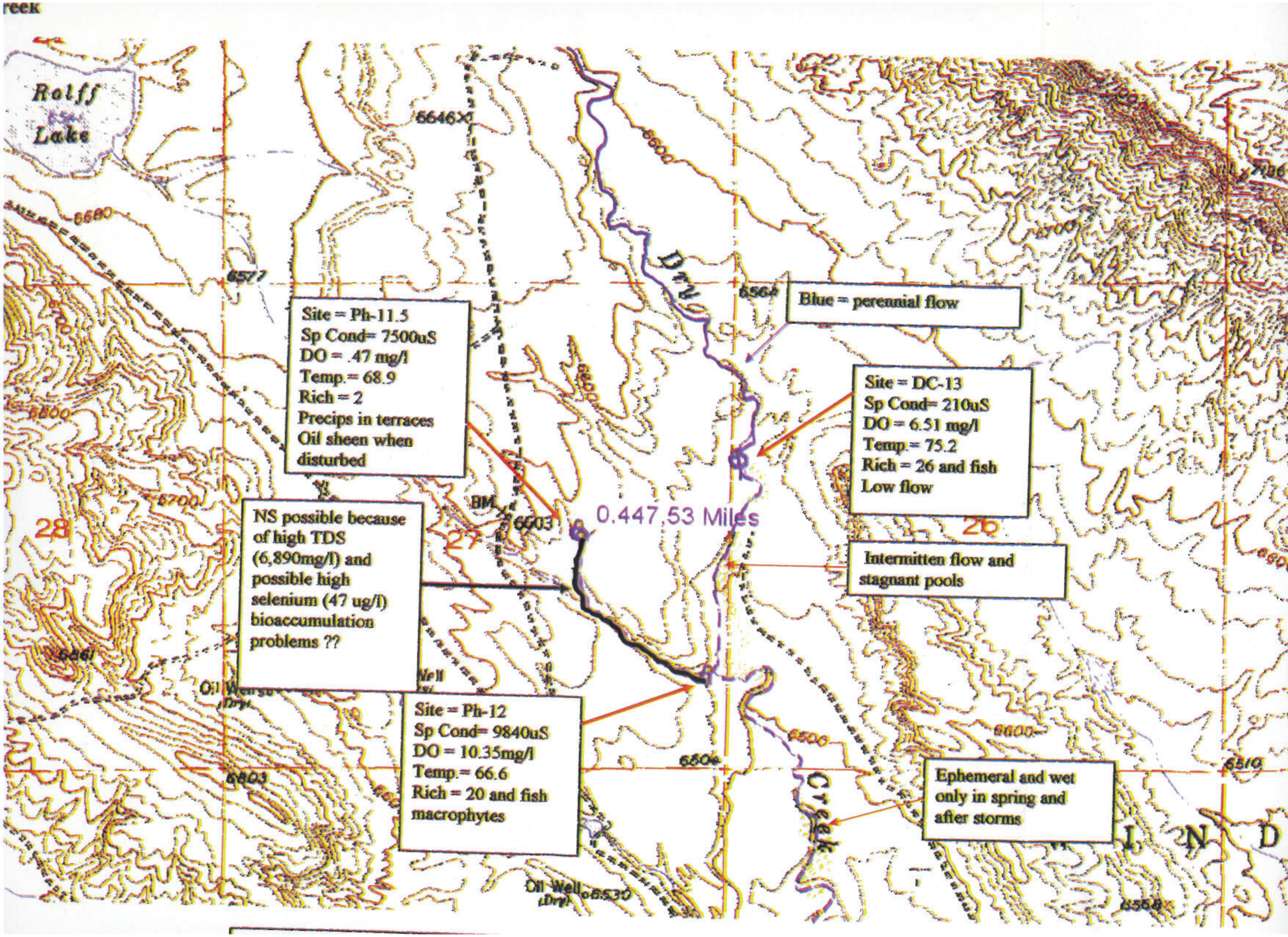
This site was established as a reference and background for the Phoenix discharge sites As expected for a mountain source stream the TDS is low at 622 mg/l. It is classified as a Rosgen C3 stream that is fully supporting of the beneficial uses associated with the Class 2C designation. Most metals are non-detect with the exception of aluminum which is 138 mg/l. The temperature was moderately high at 75.2 degrees F and also indicate the low flow conditions.

Even though this segment of Dry Creek had a very low flow, there is a rich assemblage of basin macroinvertebrates with a richness of 26 species and large schools of long-nosed dace (*Rhinichthys cataractae*) were also present.

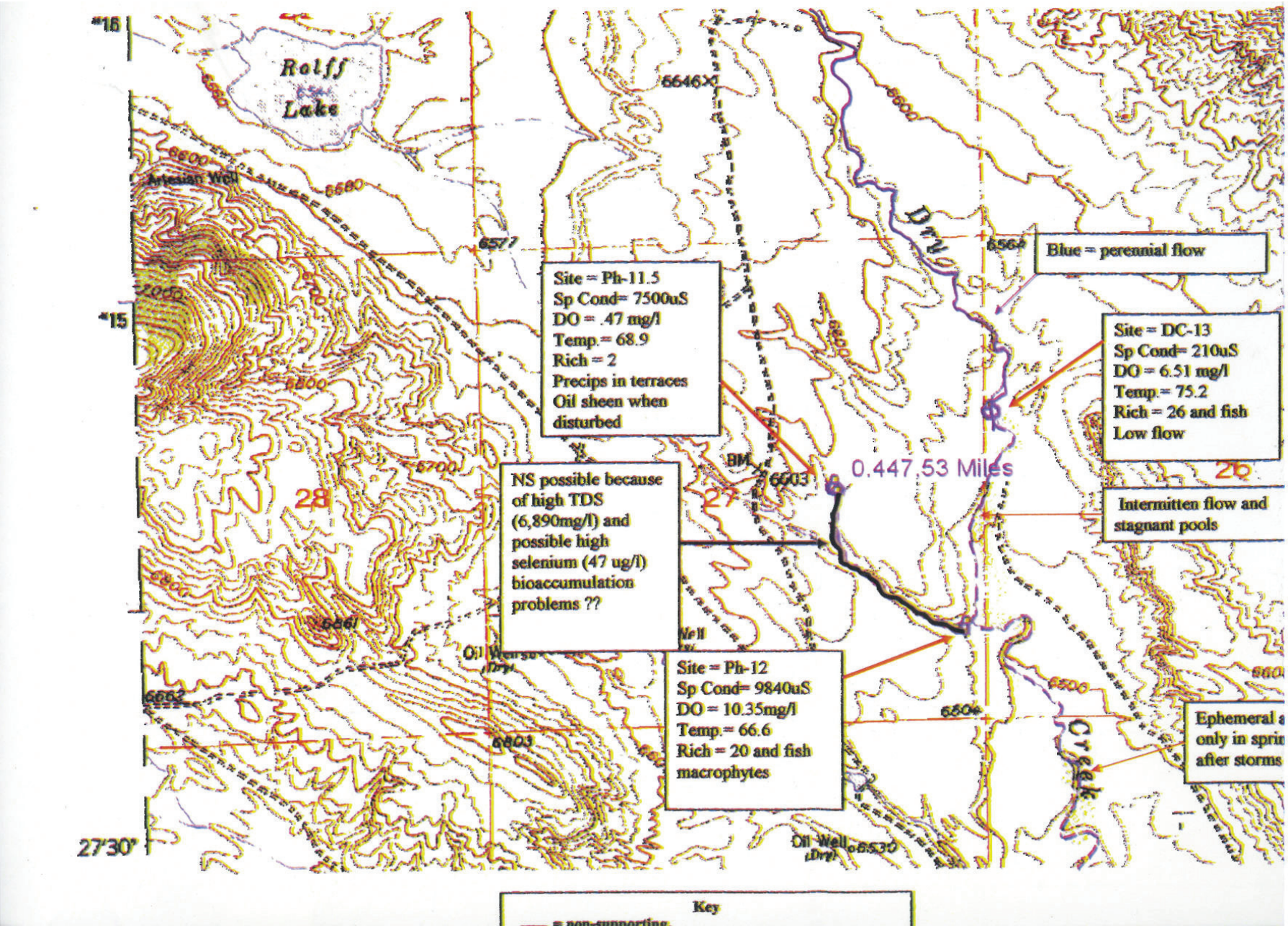
DC13-1: The bridge across Dry Creek on the way to the Phoenix production field marks this background site

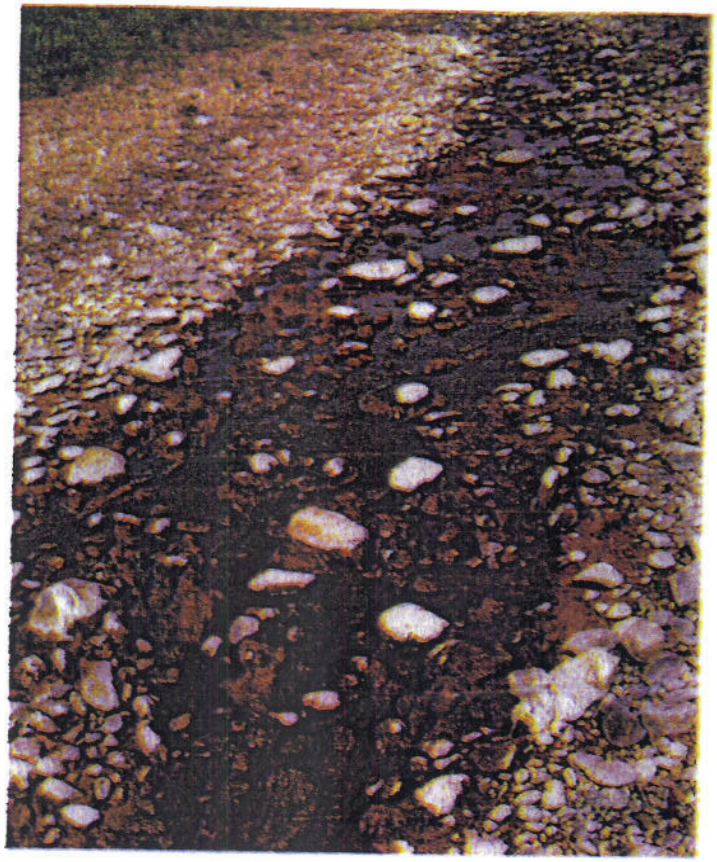

reek
Rolff Lakes
Dry
Creek
0.447,53 Miles
Blue = perennial flow
Site = Ph-11.5
Sp Cond= 7500uS
DO = .47 mg/l
Temp.= 68.9
Rich = 2
Precips in terraces
Oil sheen when
disturbed
Site = DC-13
Sp Cond= 210uS
DO = 6.51 mg/l
Temp.= 75.2
Rich = 26 and fish
Low flow
NS possible because
of high TDS
(6,890mg/l) and
possible high
selenium (47 ug/l)
bioaccumulation
problems ??
Intermitten flow and
stagnant pools
Site = Ph-12
Sp Cond= 9840uS
DO = 10.35mg/l
Temp.= 66.6
Rich = 20 and fish
macrophytes
Ephemeral and wet
only in spring and
after storms
28
27
26
6646
6577
6564
6603
6603
6604
6510
6680
6700
6800
6600
7186
Oil Well (Dry)
Oil Well 6530 (Dry)
BM
I N D


Rolff Lakes
Artesian Well
Site = Ph-11.5
Sp Cond= 7500uS
DO = .47 mg/l
Temp.= 68.9
Rich = 2
Precips in terraces
Oil sheen when disturbed
NS possible because of high TDS (6,890mg/l) and possible high selenium (47 ug/l) bioaccumulation problems ??
Site = Ph-12
Sp Cond= 9840uS
DO = 10.35mg/l
Temp.= 66.6
Rich = 20 and fish macrophytes
Blue = perennial flow
Site = DC-13
Sp Cond= 210uS
DO = 6.51 mg/l
Temp.= 75.2
Rich = 26 and fish
Low flow
Intermitten flow and stagnant pools
Ephemeral a
only in sprin
after storms
0.447,53 Miles
Key

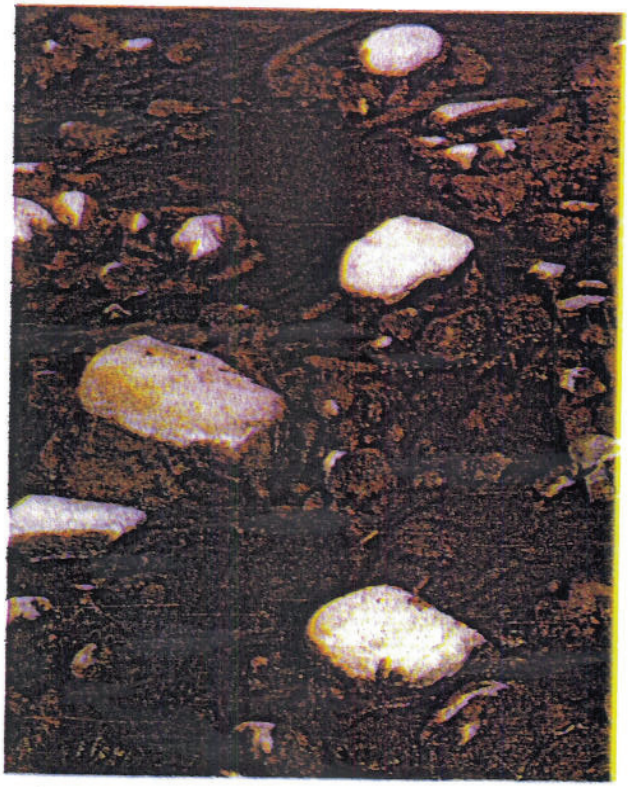


reek
Rolff Lakes
Dry
Creek
0.447,53 Miles
Site = Ph-11.5
Sp Cond= 7500uS
DO = .47 mg/l
Temp.= 68.9
Rich = 2
Precips in terraces
Oil sheen when disturbed
NS possible because of high TDS (6,890mg/l) and possible high selenium (47 ug/l) bioaccumulation problems ??
Site = Ph-12
Sp Cond= 9840uS
DO = 10.35mg/l
Temp.= 66.6
Rich = 20 and fish
macrophytes
Blue = perennial flow
Site = DC-13
Sp Cond= 210uS
DO = 6.51 mg/l
Temp.= 75.2
Rich = 26 and fish
Low flow
Intermitten flow and stagnant pools
Ephemeral and wet only in spring and after storms
28
27
26
6646
6577
6564
6603
6604
6803
6661
Oil Well (Dry)
BM


Rolff Lakes
Artesian Well
Site = Ph-11.5
Sp Cond= 7500uS
DO = .47 mg/l
Temp.= 68.9
Rich = 2
Precips in terraces
Oil sheen when disturbed
NS possible because of high TDS (6,890mg/l) and possible high selenium (47 ug/l) bioaccumulation problems ??
Site = Ph-12
Sp Cond= 9840uS
DO = 10.35mg/l
Temp.= 66.6
Rich = 20 and fish macrophytes
Blue = perennial flow
Site = DC-13
Sp Cond= 210uS
DO = 6.51 mg/l
Temp.= 75.2
Rich = 26 and fish
Low flow
Intermitten flow and stagnant pools
Ephemeral a
only in sprin
after storms
0.447,53 Miles
Key



DC13-2: Dry Creek was very low with only a little current between pools. There were still 25 species of macroinvertebrates and large schools of long-nose dace *(Rhinichthys cataractae)*.



DC13-3: A filamentous alga was prevalent and is indicative of the low flow and higher temperatures that were encountered. The stream is intermittent at the bridge, and ephemeral in the downstream reaches.

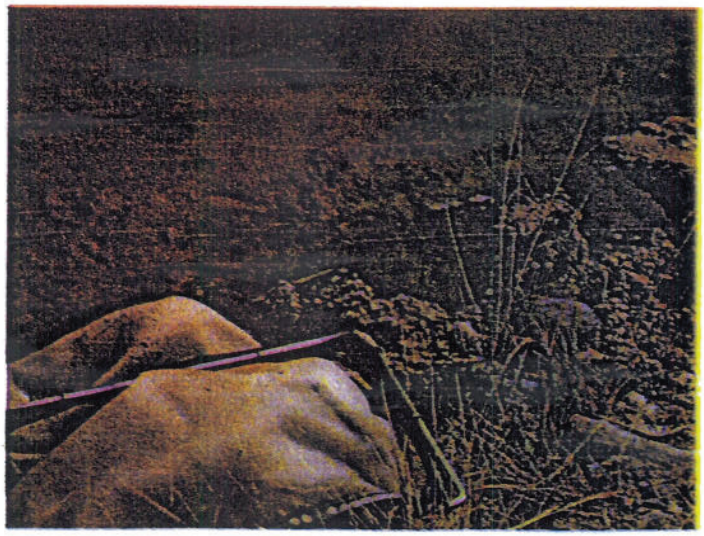
Site Ph 11.5 Just below the Phoenix Rolff Lake NPDES discharge point

NPDES sites																
Site	Site name	Str or Lk name	II_Geology	VI_Ros I_1	VI_Ros II_1	VI_Ros I_2	VI_Ros II_2	elev	Lat	Long	VIII_Anth_Ps_6	IX_Degree_6	Lim Season_6	X_Status	XI_Mgmt
PH-11.5	Phoenix NPDES Discharge Pt.	Phoenix NPDES Creek	Sed	C	precip terr	C	6c	6626	43° 28' 06.2"N	109° 05' 48.5"W	NPDES_O&G	Dep	AS	NS:?	Perm

This site is tentatively classified as a Rosgen C, precip. terr., and is dominated with precipitation terraces and precipitation covered sapropel black ooze deposits. This segment needs to have a toxic chemical screen done to see if the high selenium value of 47 ug/l that was discovered downstream comes from the NPDES discharge. The self monitoring data shows a steadily decreasing TDS since June of 1997 (9,030mg/l) to a value 5750 mg/l in 2004. This still exceeds the limit of 5,000 mg/l.

Two species of macroinvertebrates were found in very low numbers. The dipteran, ***Ephydra***, is very tolerant of low DO and hard water. The unidentified Baetidae mayfly nymph is unknown both in its identity and in its ecology. The low DO and the heavy precipitates keep the macroinvertebrate and the macrophytes diversity very low near the discharge point. The diversity at the end of this stream segment and at site Ph-12, is much higher. It is unknown why and where the changes occur but may involve springs or other water sources from the ephemeral Rolff Lake outlet that is shown on the map.

Ph11.5-1: This section is dominated by precipitation terraces that remind one of Yellowstone National Park on a small scale. The water is not hot however and was recorded at 69 degrees F in the field notes.



Ph11.5-2: Two species of macroinvertebrates were found in very low numbers.

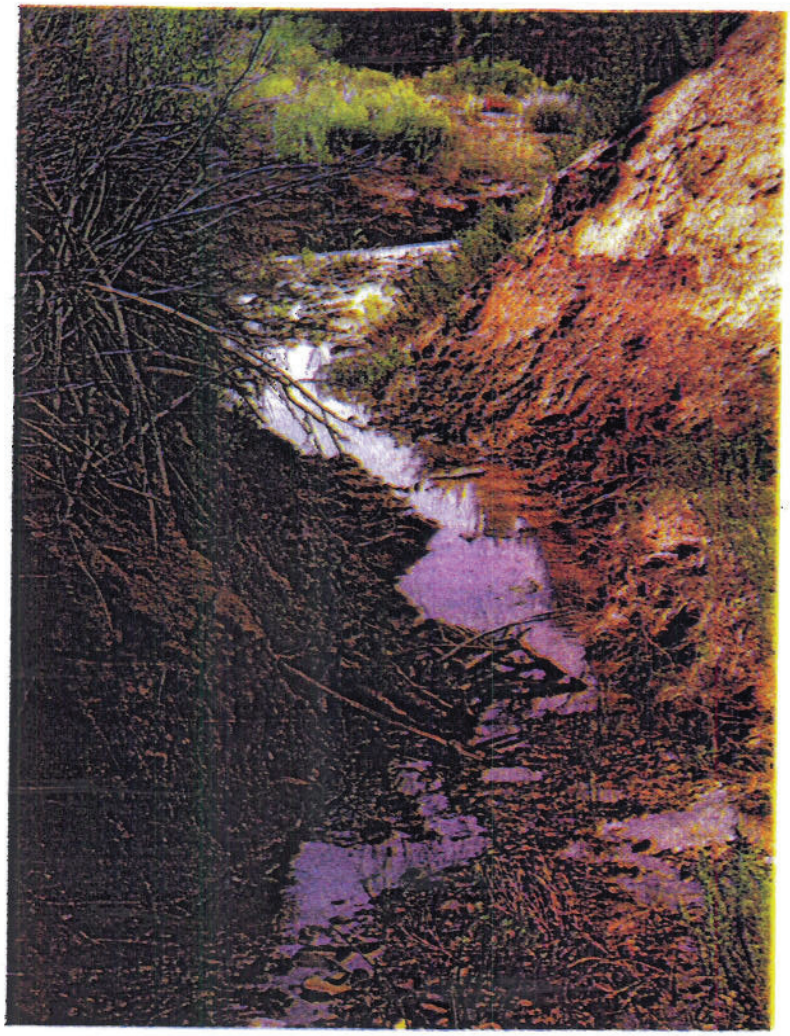
Site Ph12 Phoenix/Rolff Lake discharge just above confluence to Dry Creek

NPDES sites															
Site	Site name	Str or Lk name	II_Geology	VI_Ros I_1	VI_Ros II_1	VI_Ros I_2	VI_Ros II_2	elev	Lat	Long	VIII_Anth_Ps_6	IX_Degree_6	Lim Season_6	X_Status	XI_Mgmt
PH-12	Phoenix at Confluence with Dry Creek	Phoenix NPDES Creek	Sed	G	4			6420	43° 27' 50.3"N	109° 05' 23.8"W	NPDES_O&G	Dom	AS	NS?	Perm

This site is tentatively classified as a Rosgen G-4, and is produced water dominated. The stream cascades down the gully in a series of drops and pools. Macrophytes including sedges and cattails were present. The potential non-supporting status comes from the high TDS at 6,890 mg/l and the high selenium values at 47 ug/l. Selenium is a bioaccumulator with a recommended chronic life criterion of 5ug/l.

The dissolved oxygen at this site was very high at 10.35 mg/l. This is probably due to photosynthesis of the macrophytes that were observed and the incorporation of atmospheric oxygen in the steep drops that occur in the gully. Long nosed dace were collected as well as a fairly rich macroinvertebrate fauna with 20 species. High species diversity does not necessarily mean that this water is safe for other uses. Bioaccumulation effects often don't occur until higher in the food chains and with larger organisms such as birds and mammals. Selenium is a sulfur mimic and gets incorporated in proteins, especially in the protein keratin which makes up; hair, hooves and nails. Brittle hair and deformed hooves are some of the first signs of chronic selenium poisoning.

Ph12-1: Dean and Travis on the edge of the eroded gulley.



Ph12-2: The stream is entrenched in a steep gulley and was tentatively classified as a Rosgen G4. The steep drops and the presence of macrophytes added much oxygen to the water. The high selenium values need to be confirmed and the sources of the selenium need to be determined.

Phoenix at Sheldon Dome not evaluated yet

Pioneer Discharge at Sheldon Dome North West Oil Field (SDNW-14)

NPDES sites															
Site	Site name	Str or Lk name	II_Geology	VI_Ros I_1	VI_Ros II_1	VI_Ros I_2	VI_Ros II_2	elev	Lat	Long	VIII_Anth_Ps_6	IX_Degree_6	Lim Season_6	X_Status	XI_Mgmt
SDNW-14	Sheldon Dome NW on road	Sheldon Dome NW NPDES Creek	Sed	C	6c	C	precip on 6	6360	43° 26' 31.1"N	108° 04' 02.8"W	NPDES_O&G	Dep	AS	NS	Perm

This site had a low dissolved oxygen reading of 1.09 mg/l. The substrates were the black ooze, sapropel type with some white precipitate crusts in places. This site had a very high sulfide reading of 59,500 mg/l and a high TDS of 7,690 mg/l.

Fig. 5